

Deposition by Alexander Graham Bell, January 15, 1915

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Deposition of Alexander Graham Bell, Interference Case in the U. S. Patent Office, THE
AERIAL EXPERIMENT ASSOCIATION versus MYERS

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1915 Jan 15 Beinn Bhreagh Recorder XVII THE A. E. A versus MYERS.

Interference case in the U. S. Patent Office N o 34455. Subject matter Flying Machines.
Case of Bell, Baldwin, McCurdy, Curtiss & Selfridge (The Aerial Experiment Association)
versus George Francis Myers, Esq, 840 Ellicott Square, Buffalo, N.Y. Testimony was
taken on Dec 16, 1914, at 11 a.m. at the offices of Mauro, Cameron, Lewis & Massie, 700
10th St, NW, Washington, D.C. The following is the deposition of Mr Bell.

Deposition of Alexander Graham Bell

And thereupon Alexander Graham Bell, being first duly sworn, deposes and says, in
answer to interrogatories propounded by Mr Kerk h am:—

Q. 1: Please state your name, age, residence and occupation.

A: Alexander Graham Bell; age, sixty-seven; residence, Washington, D.C.; occupation,
Scientist.

Q. 2: Are you the Alexander Graham Bell who was adjudged to be the inventor of the
telephone?

A: Yes.

Q. 3: Are you a citizen of the United States of America?

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A: I am.

Q. 4: Please give a partial list of any honors or degrees that have been bestowed upon you.

Mr Bell's Degrees: A Partial List

A: A good many honors have been bestowed upon me, but I can hardly remember them all. I was made a Ph. D. 196 by the National Deaf Mute College, of Washington, D.C., now Gallaudet College, as a recognition of my work for the Deaf, and if I remember rightly, this degree was also conferred upon me by Illinois College in the United States, and by the Wurtzburg University in Germany. The degree of LL.D has been given me by Harvard University, Amherst and Dartmouth, in the United States; by Kingston in Canada; and by St Andrew's University and Edinburgh University in Scotland. The degree of Doctor of Science has been conferred upon me by Oxford University; and Heidelberg, Germany, conferred upon me the honorary degree of Doctor of Medicine, as a recognition of my work in the painless detection of bullets in the human body. I was the recipient of the Royal Albert Medal of Great Britain, and of a number of other medals and honors from scientific and other bodies. The French Government awarded me the Prix Volta of 50,000 francs for the invention of the magneto electric telephone, and I was made an Officier of the French Legion of Honor.

Q. 5: Are you the Alexander Graham Bell who was one of the joint inventors of the structure shown in U. S. patent N o 1,011,106, dated Dec 5, 1911, involved in this interference?

A: I am.

Q. 6: When did you first become interested in the subject of aerial navigation?

40 Years Interested in Aerial Locomotion

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A: The subject of aerial locomotion has always interested me, certainly for more than forty years. I had been a firm believer in the possibility of aerial flight by 197 machines heavier than the air and driven by their own motive power, and was specially confirmed in this belief when, on May 6, 1896, I was a witness of the successful flight of Langley's aerodrome model at Quantico on the Potomac.

Mr Bell's Friendship With Langley

Prof. Langley was a personal friend, and I was the only invited witness on this occasion. Prof. Langley was Secretary of the Smithsonian Institution, and subsequently to the occasion referred to I became a Regent of the Smithsonian Institution, a position which I still hold.

The success of Langley's steam driven model and my own personal association with Secretary Langley greatly stimulated my interest in the whole subject of aerodromics, as Langley termed the science and art to which this subject belonged.

Experiments With Kites

I therefore decided to carry on private experiments of my own that would have a bearing upon the problems involved. As there were no motors available for such work, it occurred to me that a great deal of valuable information concerning the conditions required in flight could be obtained from the study of kites. A kite seemed to me essentially to be a tethered flying machine. Instead of a machine driven against the air, we had the air driven against the machine. I had been engaged in the flying of kites as a scientific amusement, and then took up the serious problem of constructing a kite large enough to lift a man in the air.

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A Kite as Large as a House

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Starting with the Hargrave box-kite as a model, I constructed larger and larger kites of this kind, until finally I constructed one so large that it would not fly. Each increase of dimensions seemed to interfere with the flying qualities of the kite, until, with a kite of giant dimensions, and as large as a small house, it would have taken a hurricane to raise it into the air.

I speedily saw that this curious conclusion resulted from the fact that, while the supporting surfaces increased as the square of the dimensions, the weight increased as the cube. This led me to fear that it would be impracticable to construct a machine upon a large scale that would fly as a kite and support a man in the air, and form a basis for studies relating to the form of structure that would be suitable for an aerodrome or flying machine by merely increasing the dimensions of a good flying model.

Cellular and Tetrahedral Kites

This led me to the conception of a cellular construction, so as to make a compound structure of numerous small kites, each of which would fly by itself, and then, by fastening them together, secure a large structure of equal flying power, capable of supporting a man. This plan, the triangular plan of construction, was subsequently developed into a compound structure in which the individual units or cells were of the tetrahedral form, such as shown in my patent 770, 626.

Q. 7: What, if anything, did you do toward building 199 a tetrahedral kite of man-carrying proportions?

A Man-Carrying Kite

A: I found, upon increasing the dimensions of my compound tetrahedral structures, that the weight of the whole compound structure was not proportionally greater than the weight of the individual units of which they were composed. So I went on making larger and larger compound forms, until at last I constructed a kite known as the "Frost King",

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which successfully carried a man on the flying line. I then determined to build a still larger structure, put a man in the structure and propel it, if possible, by an engine. It was my intention to make it so large that it would fly as a kite carrying a man, an engine and all. Start the propeller while it was in the air, drive it against the wind, and when the towing line should become slack, drop the towing line and leave it to pursue its way through the air as a free flying machine, or aerodrome.

McCurdy, Baldwin, Curtiss & Selfridge

Before actually constructing such a structure in which the life of a man was to be risked, I determined to have the advice and assistance of experts, and so invited to my summer place in Nova Scotia two Canadian engineers, Mr John A.D. McCurdy and Mr F.W. Baldwin, two of the joint inventors of patent 1,011,106, and Mr Glenn H Curtiss, of Hammondsport, N.Y., a noted expert relating to light motors for motor-cycles.

Of course, some word had gone out to the public that I was at work upon this subject, and Lieut. Thomas 200 E. Selfridge, First Field Artillery, U.S.A., who was making a specialty of studying the various means that had been suggested for accomplishing aerial flight, in the interests of the United States Army, came to my summer place in Nova Scotia to witness my experiments in the interests of the United States Army, and he was afterwards specially detailed as an observer. Mr Curtiss and Lieut. Selfridge were two of the joint inventors of U.S. patent 1,011,106.

Cygnet N o 1: Selfridge's Ascent

With these gentlemen present, I proceeded to build a giant kite, known as the kite "Cygnet N o 1", and on Dec 6, 1907, Lieut. Selfridge made a successful ascent in this kite, which was towed by a steamboat. He was carried up, if I remember rightly, to a height of about 168 feet in the air, over the waters of the Bras d'Or Lake in Cape Breton Island, Nova Scotia.

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Q. 8: Have you any photographs of this kite?

A: Yes. I produce herewith Appendix B of Bulletin N o 39 of the "Aerial Experiment Association", which Bulletin and Appendix B were issued on Monday, April 12, 1909. This Bulletin was the last bulletin issued by the Aerial Experiment Association, and contained three appendixes, A. B. and C. Appendix A was issued with the Bulletin itself. Appendix B was issued separately and distinctly as "A Souvenir Volume of Enlarged Photographs Illustrating the Work of the Aerial Experiment Association." On pages 3, 4, 5, 6, 7, and 8 of Appendix B, appear photographs of the kite "Cygnet N o 1" to which reference has been made. I call attention to the fact that the legend below the 201 photograph on page 5 shows the date "Dec 6, 1909" by error, instead of "Dec 6, 1907", as stated correctly in the index to the volume.

Q. 9: Is this Appendix B in the condition in which it was when issued.

A: Yes, it was a specially bound volume for presentation to Mrs Bell, and is in the condition that it was when issued.

Q. 10: Who was the editor of this appendix?

A: I was.

Q. 11: Please state when this Appendix actually issued?

A: April 12, 1909.

Q. 12: I ask you to read the typewritten pages preceding Mrs. Bell's photograph on page 1 of Appendix B, and to state who wrote the same.

A: I did, and the facts therein stated are true.

The Bulletins of the A. E. A.

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BY MR KERKAM: The volume entitled on the outside "Aerial Experiment Association", Bulletin XXXIX, Souvenir Volume, Mrs Alexander Graham Bell", and on the inside, "Bulletins of the Aerial Experiment Association Bulletin N o xxxix, issued Monday, April 12, 1909. Appendix B. A Souvenir Volume of Enlarged Photographs Illustrating the Work of the Aerial Experiment Association. Complimentary. Mrs Alexander Graham Bell. Beinn Bhreagh, near Baddeck 202 Scotia", is offered in evidence, and the Notary is requested to mark the same "Exhibit N o 1 of Bell et al., Souvenir Volume of Enlarged Photographs, illustrating the Work of the Aerial Experiment Association".

The Aerial Experiment Association

Q. 13: On the back of this Appendix B are printed the words "Aerial Experiment Association". What was this Association, and its objects?

A: Messrs. McCurdy, Baldwin, Curtiss and Selfridge having been associated with me in the construction of tetrahedral structures, Mrs Bell suggested that we form ourselves into an Association and keep together, working conjointly on the subject of aerial flight, until we had, as a matter of fact, constructed a practical aerodrome, carrying a man, and propelled by its own motive power. This resulted in the organization, on October 1, 1907, of the Aerial Experiment Association, having as its assigned object, to "get into the air" by the construction of a practical aerodrome propelled by its own motive power and carrying a man.

Q. 14: After the flight of Lieut. Selfridge in the machine shown in the photographs on pages 3 to 8 inclusive, of Appendix B, what was then done by the Association?

A: We addressed ourselves energetically to the problem of constructing a motor-driven aerodrome. Our summer quarters were at Baddeck, Nova Scotia, where I had my summer home, and winter quarters were established in 203 Hammondsport, N.Y., where Mr Curtiss had his motor cycle factory.

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Q. 15: When did the Association begin work in Hammondsport, N.Y.?

A: I think it was the end of December 1907, but at all events, we were at work there in January 1908.

Q. 16: What was the first machine that was built in Hammondsport by the Association?

A. "The Hammondsport Glider", photographs of which are shown on pages 9 and 10 of Appendix B.

Q. 17: When did the Association build its first motor-driven aerodrome?

Mr Baldwin Makes the First Public Flight In a Heavier than Air Machine.

A: To the best of my recollection, it was commenced while experiments were being made with the "Hammondsport Glider". It was commented completed in about two months, at any rate it made its first successful flight on March 12, 1908, at Lake Keuka, near Hammondsport, N.Y., in the presence of many witnesses from Hammondsport. Mr F. W. Baldwin was the aviator on that occasion. This so far as I know, was the first public flight of a heavier-than-air machine in America.

At that time there had been rumours of what the Wright Brothers were doing in the South, but they flew in secret, and nothing definite was known about their work on machines.

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"Selfridge's Red Wing".

Q. 18: What was the official designation of this machine which flew successfully on March 12, 1908?

A. "Drome N o 1, Selfridge's Red Wing". "Drome" is an abbreviation of "Aerodrome"

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Q. 19: Please describe the “Red Wing” as it was in March, 1908.

A. There were two main supporting surfaces, suitably connected together by rigid trussing. The upper surface was concave underneath, and the lower concave above. The upper surface projected beyond the lower at either side, and the rear edge was flexible, and the portions extending beyond the lower were also flexible, as it was believed that this would contribute a certain measure of automatic stability to the machine. The machine was provided with a front control or elevating device at the bow, and a vertical rudder at the rear for steering purposes. The motor was mounted between the supporting surfaces, and the propeller was arranged behind the motor. In view of the fact that this machine was started from the ice on Lake Keuka, it was provided with sledge-runners.

Q. 20: Have you any photographs showing the “Red Wing”?

A: Yes; two photographs are shown on pages 11 and 12 of Appendix B, Exhibit N o 1. The photograph on page 11 shows Mr W. F. Bedwin standing beside the machine. He was the Superintendent of my laboratory at Beinn Bhreagh, near Baddeck, Nova Scotia. The photograph on page 12 shows in Glenn H. Curtiss in the aviator's seat. These photographs 205 show the construction of the “Red Wing” very clearly.

Q. 21: I hand you a post-card, postmarked Hammondsport, N.Y. April 14, 1908, on one side, and Washington, D.C. April 15, 1908, on the other side, and addressed to “Mr William B Kerkam, 620 F St, N.W., Washington, D.C.” Please state, if you know, what machine is shown on this postcard, and state if you recognize any of the people appearing in the picture.

A. The machine is “Drome N o 1, Selfridge's Red Wing”. The man in the seat is Lieut Selfridge, and the man on the left, nearest to the machine I think is Mr Bedwin. The others I do not recognize.

BY MR KERKAM:

The postcard in question is offered in evidence, and the Notary is requested to mark same, "Exhibit N o 2 of Bell et al. Postcard dated April 14, 1908 showing "Red Wing" ".

Q. 22: Please state, if you know, what became of the "Red Wing".

Destruction of the "Red Wing"

A. The machine was destroyed on March 17, 1908, during a flight on Lake Keuka. It slid off the wind and came down on one wing. The photographs shown on pages 13 and 14 of Appendix B, Exhibit N o 1, illustrate very clearly the nature of the accident which destroyed the machine, leaving the engine and the aviator uninjured. Mr F. W. Baldwin was the aviator upon the occasion.

The photograph on page 13 shows the machine turning over on its side immediately before the catastrophe occurred, and the photograph on page 14 shows the machine with one 206 wing partially crushed in by the ice. Before the accident occurred it had been supposed that the machine possessed automatic stability to a certain extent on account of the elasticity of the extremities of the main or upper supporting surfaces, and on account of its having a concavity underneath, so that when the machine tipped to one side under the action of a side squall the wind would strike the under portion of the concave surface on the depressed side and not under the other side, so that there would be a greater lifting power on the depressed side than the elevated side, tending to right the machine.

The catastrophe of March 17, 1908, showed that we had over-rated the automatic stability of this form of machine and brought home forcibly the advisability of directing attention to some form of control over lateral stability.

Q. 23: What, if anything, was done following the destruction of the "Red Wing" toward the building of a new aeroplane?

Baldwin's "White Wing"

A. Only a few days elapsed before work was begun on what was known officially as "Drome No 2, Baldwin's White Wing". This machine was completed by May 14, 1908, and was successfully flown about that time.

On May 18, 1908, Mr Baldwin got into the air on this machine, and flew a distance of 279 feet at a height of about ten feet, and on May 19, 1908, Lieut. Selfridge made two flights in the "White Wing", the second of 240 feet, twenty feet in the air. I witnessed these flights and they were very inspiring.

Maintaining Lateral Equilibrium

Q. 24: What, if anything, was done by the members of the "A. E. A" to provide means for maintaining lateral equilibrium, in the construction of the "White Wing", and what importance was attached to the provision of such a balancing means?

A: Immediately after the destruction of the "Red Wing" it was recognized that some means of voluntary control over lateral stability was of primary importance, and the members of the Association took up the discussion of the subject, and we kept right at it at Hammondsport until we devised what we thought would be a successful means. I remember especially that I was in Hammondsport in the early part of April, 1908, and that all the members of the Association discussed this matter with earnestness at that time, and believed that we had reached the solution of the problem. As I stated before this was in the early days of April, 1908. Our conception was that, when from any cause the machine should tip to one side, to increase the lifting power of the depressed wing and diminish the lifting power of the elevated wing until equilibrium should be restored; this was to be accomplished by flat surfaces or ailerons mounted beyond the supporting surfaces of the machine at either end, which could be turned up or down as required to produce an elevating or depressing effect. These surfaces were to be placed at a zero angle of

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incidence under normal conditions. A pivoted lever was 208 to be provided embracing the body of the aviator, and cords were to connect the lever and ailerons, so that by leaning to one side or the other the aviator could operate the lever which, through the connecting cords, would cause the ailerons on one side to be elevated and on the other to be simultaneously depressed, the depression of one being to the same degree as the elevation of the other.

Q. 25: Why were the ailerons to be normally arranged at a zero angle of incidence?

A. So that the actuation of the ailerons by the aviator would produce a purely balancing function. The moment one of the ailerons was inclined this occasioned a resistance at one side of the machine, thus tending to turn the machine around a vertical axis. But we thought that by introducing an exactly equal resistance at the other side of the machine, by the operation of an aileron there, we would introduce an exactly equal resistance at that side of the machine, tending to turn the machine in the opposite direction.

The Theory of the Ailerons

And if these two resistances were exactly equal, no turning effect would be produced, and the machine would not swerve from its path when the ailerons were actuated. By elevating the ailerons on the depressed side and depressing the ailerons on the elevated side — that is, by moving the aileron on the depressed side to a positive angle of incidence, and the aileron on the elevated side to a negative angle, a righting effect would be produced. And of the resistances thus introduced by the ailerons at either 209 side of the machine were equal, the machine would not swerve from its path. In order that these resistances should be equal, it was necessary that the ailerons should be normally horizontal, that is, at a zero angle of incidence; and that they should be simultaneously moved to equal and opposite angles of inclination. This was the conception of means that grew out of these discussions among the joint inventors in Hammondsport in the early days of April, 1908.

The Discussions on Lack of Lateral Stability

Q. 26: How do you fix the date of the conception of the lateral balancing rudders normally arranged at a zero angle of incidence in the early days of April, 1908?

A. I remember very distinctly that immediately after the destruction of the "Red Wing" on account of lack of lateral stability, the members of the Association took up the discussion of means for correcting it. I remember that I visited Hammondsport during the early days of April 1908, and that the conception and discussions above referred to took place at that time, this conception being the product of the discussions of the joint inventors at that time. Aside from my independent recollection of these discussions and conception in Hammondsport at that time, I call attention to the photograph on page 2 of Appendix B, Exhibit N o 1, which shows all five of the joint inventors, together with Capt. T. S. Baldwin, Mr. Williams and Mr Bedwin, which was taken during my visit to Hammondsport on April 6, 1908.

Q. 27: Please state whether or not the "White Wing" 210 was in course of construction when you were in Hammondsport early in April, 1908?

A. It was.

Q. 28: Please describe briefly the "White Wing"

Description of "White Wing"

A. The machine was completed about the middle of May, 1908, and successfully flown on May 18 and 19, 1908. There were two supporting surfaces, the upper one concave below and the lower one concave above, connected together by rigid trussing. Two Ailerons were provided on each side of the machine beyond the extremities of the supporting surfaces, and the ailerons were pivoted on prolongations of the front member of the frame of each supporting surface. A pivoted lever had a part embracing the body of the aviator

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connected to the ailerons by wires, so that when the aviator leaned to one side when the machine tipped in the air (he would lean naturally to the high side) the ailerons on the depressed side would be turned to a positive angle of incidence, and the ailerons on the elevated side would be depressed.

Q. 29: Have you a photograph illustrating the “White Wing”?

A. Yes: the “White Wing” is shown on pages 15 and 16 of Appendix B, Exhibit N o 1, the photograph on page 15 being a particularly clear view of the construction of the machine.

Q. 30: Do you know whether the balancing ailerons on the “White Wing” were, as a matter of fact, normally arranged at a zero angle of incidence?

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A. They were not. When the machine was completed in May, 1908, the ailerons were normally in line with the supporting surfaces. In deed, the ailerons on the “White Wing” were never normally arranged at a zero angle of incidence.

Zero Angle of Incidence Not Adhered To.

Q. 31: Please state why, if you know, the original intention of the joint inventors to have the lateral balancing rudders normally arranged at a zero angle of incidence was not adhered to in the “White Wing”?

A. Although it was well understood that it was advisable to have them at a zero angle of incidence, under normal conditions, it was also understood that horizontal surfaces did not aid in the support of the machine. A supporting surface must necessarily have a positive angle of incidence. If, then, we arranged these surfaces horizontally, we were deprived of just so much supporting surface, and that was one thing we could not afford. Our motors were not very powerful and we needed all the supporting surface we could get. Hence the time when the balancing ailerons could be arranged at a normal zero angle

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of incidence had to be postponed until we could get a machine that flew well enough so that we could sacrifice the area of supporting surface that was involved in these lateral balancing ailerons.

Q. 32: What was the fate of the “White Wing”?

Destruction of the “White Wing”

A. It was destroyed in the latter part of May 1908, in an accident during a flight by Mr McCurdy.

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Q. 33: When and where was the next machine built by the Association?

A. Work on the next machine, which was known as “Drome N o 3, Curtiss' June Bug”, was begun within a few days after the destruction of the “White Wing”. The “June Bug” was completed about the middle of June, 1908, and successfully flown about that time, at Hammondsport, N.Y.

Q. 34: Please briefly describe the “June Bug” as it was in June 1908.

“Drome N o 3, Curtiss' June Bug”

A. With respect to the construction and arrangement of the supporting surfaces and the balancing ailerons and the means for actuating the same, the machine was substantially similar to the “White Wing”.

Q. 35: How were the ailerons on the “June Bug” arranged with respect to their associated supporting surfaces when the machine was completed and first successfully operated?

A. As in the “White Wing”, they were arranged in line with the supporting surfaces when first tried, so that we could have all the supporting surface available. When the “June

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Bug” was first completed, we were disappointed that it did not fly well enough to enable the ailerons to be placed normally at a zero angle of incidence. The supporting surfaces seemed to be somewhat porous, and allowed the air to leak through. We corrected this leakage of air by varnishing the supporting surfaces so as to make them air-tight.

Q. 36: What, if any, difference was observed in the flight of the “June Bug” after the supporting surfaces 213 were made airtight by varnishing?

A. At once a marked improvement was manifest. The machine flew so well that it was evident we had surplus supporting power, and at once the ailerons were changed to a normal zero angle of incidence, so that we could avail ourselves of the benefits and advantages of this construction.

Q. 37: When was this change made — that is to say, when were the ailerons changed to a normal zero angle of incidence?

A. The change was made on June 25, 1908, or a day or two later.

“The Ailerons Functioned Admirably”

Q. 38: How did the “June Bug” operate with the lateral balancing rudders arranged normally at a zero angle of incidence?

A. Perfectly, and the ailerons functioned admirably.

Q. 39: Please state, if you know, how the “June Bug” received its name.

A. Because it was completed in the month of June, and flew like a June bug in the air. I suggested the name.

Q. 40: How did the construction of the “June Bug” as it was in June, 1908, compare with the drawings of patent 1, 011, 106?

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A. The patent office drawings were made from the "June Bug".

Q. 41: Were the ailerons on the "June Bug" arranged as shown in Fig. 4 of the drawing, or in Figs 2 and 5 of 214 the drawing.

A. They were arranged as in Fig 4. Figs 2 and 5 show a mere modification.

Q. 42: How often was the "June Bug" successfully flown with the lateral balancing rudders arranged at a zero angle of incidence?

A. To my knowledge, it was so flown a very great number of times; how many I am not prepared to say.

The Scientific American Trophy

Q. 43: Did the "June Bug" ever perform in a particularly noteworthy manner?

A. On July 4, 1908, it gained the Scientific American Trophy for flying the first measured kilometer under test conditions for a heavier-than-air machine.

Q. 44: Who operated the machine when it won this trophy?

A. Mr Glenn H. Curtiss.

Q. 45: Did this flight attract any particular attention?

A. It attracted world-wide attention, and was noted in nearly all the newspapers of the time.

Q. 46: Have you any photographs showing the June Bug?

A. Yes, photographs of the "June Bug" are given on pages 17, 18, 19, 20, 21, 22, and 23 of Appendix B, Exhibit N o 1. The photograph on page 17 shows very clearly the

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arrangement of the ailerons at a normal zero angle of incidence. The ailerons are also clearly shown on the other photographs referred to.

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Q. 47: What can you say regarding the public interest in the work of the Aerial Experiment Association and the publicity surrounding the building of the various machines at Hammondsport, N.Y.?

A. The public interest in our work was very great. Press reports of what we were doing continually appeared in the papers, and all our work was performed publicly, and we made no secret of what we were doing.

Q. 48: When and where was the next machine built by the A. E. A.?

A. The next machine was known officially as “Drome N o 4, McCurdy's Silver Dart”. Its construction was commenced soon after July 7, 1908, and the machine was completed and successfully operated shortly thereafter — within a few weeks — at Hammondsport, N.Y.

McCurdy's “Silver Dart”

Q. 49: Was this machine furnished with lateral balancing rudders, and if so, how were they arranged?

A. Yes. They were normally arranged at a zero angle of incidence, as in the “June Bug”, and as described and illustrated in our patent 1,011,106.

Q. 50: Please state, if you know, what happened to the “Silver Dart”?

A. After making many successful flights in Hammondsport in the fall of 1908, it was taken to Canada by Mr McCurdy, and made many successful flights over the ice in Baddeck

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Bay, Nova Scotia, particularly during December, 1908. Sometime subsequent to this it was destroyed in an accident.

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Q. 51: Have you any photographs showing the “Silver Dart”?

aA: Yes; it is shown on pages 26, 27, 28, 29, and 30 in Appendix B, Exhibit N o 1.

Q. 52: Do you know what became of the “June Bug”?

Conversion of “June Bug” into “Loon”

A: In the Fall of 1908, floats were added to the “June Bug”, converting it into a hydro-aerodrome, whereupon Mr Curtiss changed its name from the “June Bug” to the “Loon”.

Q. 53: Have you any photographs showing the “Loon”?

A. Yes; photographs of the Loon are shown on pages 23, 24, and 25 of Appendix B, Exhibit N o 1.

The Names of Members & Machines.

Q. 54: I note that the “Red Wing” was called “Selfridge's Red Wing”; that the “White Wing” was called “Baldwin's White Wing”; that the “June Bug” was called “Curtiss' June Bug”; and that the “Silver Dart” was called “McCurdy's Silver Dart”. Did the naming of these machines after these gentlemen mean that the person whose name was associated with the machine was the sole inventor of the construction embodied therein?

Each Machine Joint Work of Five Inventors

A. Not at all. Each of the various machines of the Association was the joint work of the five joint inventors, with the exception of the subject matter of patent 1,010,842, which was granted to Mr F. W. Baldwin, as sole inventor. He 217 was the sole inventor of the

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particular construction and arrangement of the supporting surfaces and the manner of trussing them together. We thought it appropriate to name our first aerodrome after Lieut. Selfridge, in view of the fact that he represented the Government, so to speak. The succeeding machines were simply named after other members of the Association. The machine named after me was called "Drome N o 5, Bell's Cygnet 2"

Q. 55: Have you a photograph of "Drome N o 5, Bell's Cygnet 2"?

A. Yes; this machine is shown on page 31 of Appendix B, Exhibit N o 1.

Death of Lieut. Selfridge

Q. 56: What do you know about the death of Lieut. Thomas E. Selfridge?

A. He was killed in an accident at Fort Myer, Va., while flying with Orville Wright on Sept, 17, 1908.

Q. 57: How long was the life of the Aerial Experiment Association?

The Life of the A. E. A.

A. Eighteen months — from October 1, 1907 to March 31, 1909. The Association had succeeded in constructing man-carrying, motor-driven aerodromes, so that the object of the Association had been fully accomplished. It was only an experimental association, and the experimental stage had come to an end. It expired on March 31, 1909, by time limitation.

Q. 58: Can you tell approximately how much money 218 the Association spent during the eighteen months of its existence?

Mrs Bell's Contribution to Science

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A. About forty-five thousand dollars, of which Mrs Bell contributed thirty-five thousand dollars. The money was contributed by Mrs Bell and myself in the interests of science, and to advance the cause of aviation, without any expectation of any financial return, and as a matter of fact, we have never received a cent. The whole idea of the formation of the Association originated with Mrs Bell, and she desired to support the expense of the experiments out of her personal estate.

Q. 59: I hand you a telegram dated "July 5-6" and addressed to "Mauro, Cameron & Lewis", Solicitors of Patents, Washington, D.C." The telegram is as follows:—

"Please send someone to Hammondsport, N.Y. at once at my expense to examine the aerodrome of the Aerial Experiment Association which has just won the Scientific American Trophy for heavier-than-air machine. We want to know what patentable features there may be about the machine. See Mr Curtiss and report to me by mail at Baddeck, Nova Scotia and oblige take Lackawana or Erie train Bath local from there to Hammondsport.

Graham Bell."

Do you know who sent this telegram to Mauro, Cameron & Lewis?

A. I did.

Q. 60: From where was this telegram sent and in what year?

A. It was sent from Charlottetown, Prince Edward's Island, in 1908. I observe that the telegraph company left off the year.

Library of Congress

BY MR KERK H AM: The telegram in question is offered in evidence as "Exhibit N o 3 of Bell et al, Telegram to Mauro, Cameron & Lewis" and the Notary is requested to mark the same accordingly.

Q. 61: I hand you herewith a letter which reads as follows:—

“THE AERIAL EXPERIMENT ASSOCIATION” Headquarters, Hammondsport, N. Y.

Alexander Graham Bell, Chairman,

G. H. Curtiss, Director of Experiments,

F. W. Baldwin, Chief Engineer,

J. A. D. McCurdy, Treasurer,

T. Selfridge, Secretary.

July 23, 1908. Mauro, Cameron, Lewis & Massie, Washington, D.C. Gentlemen,

I am taking the liberty of enclosing a letter to Mr Curtiss from Mr. Orville Wright which may have some bearing on patents which may be taken out for the Aerial Experiment Association.

I am enclosing a sketch for a device for raising or depressing the aerodrome in flight which is a modification of the one we are at present using, but which has numerous advantages and should be covered in our patents.

Yours, T. Selfridge, 1st Lt., 1st F.A. P.S. If you will read claim 14, pat 821, 393 you will plainly see we do not infringe it. Our wing tips being always at a zero angle unless working to correct tipping don't have to be compensated for by the vertical rudder mentioned. T.S.

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They have assumed in their letter that our tips are parallel to our surfaces when not in use for correcting tipping.

Do you recognize the handwriting of this letter, and if so who wrote the same?

220

A. It was written by the late Thomas E. Selfridge. I recognize the handwriting.

BY MR KERKAM: The letter in question is offered in evidence as “Exhibit N o 4 of Bell et al, Selfridge letter dated July 23, 1908”, and the Notary is requested to mark the same accordingly.

Q. 62: Can you produce any publications illustrating or referring to the “June Bug”?

The “June Bug” & Publicity

A. There were hundreds of such publications, but I produce only two. These are issues of the Scientific American of July 4, 1908, and July 18, 1908, as these seem appropriate considering the fact that they refer to the flight for the trophy given by the Scientific American. The side and front views shown on page 13 of the issue of July 4, 1908, illustrate very clearly the fact that the ailerons were placed normally at a zero angle of incidence. It will be observed that on page 45 of the issue of July 18, 1908, the Editor speaks of the “horizontal wing tips” in the upper photograph, and comments on the “downward inclination of the left-hand wing tip for the purpose of righting the machine” in connection with the lower photograph.

BY MR KERKAM: The issue of the Scientific American of July 4, 1908 is offered in evidence, and the Notary is requested to mark the same “Exhibit N o 5 of Bell et al, Scientific American of July 4, 1908”

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The issue of the Scientific American of July 18, 1908, and the Notary is requested to mark the same "Exhibit N o 6 of Bell et al, Scientific American of July 18, 1908."

Q. 63: When did you first meet George Francis Myers 221 with those application patent N o 1,011,106 is involved in this interference?

George Francis Myers.

A. I first met Mr Myers in Hammondsport, N.Y., sometime in the summer of 1908.

Q. 64: Did you ever discuss with Mr Myers the question of maintaining balance in a flying machine, and particularly, did you ever discuss with him the proposition of arranging lateral balancing rudders or ailerons normally at a zero angle of incidence?

A. I never had any discussion at all with Mr Myers.

Q. 65: Did you ever hear Mr Myers claim to be the inventor of a flying machine provided with lateral balancing rudders normally arranged at a zero angle of incidence?

A. I never did.

(signed) ALEXANDER GRAHAM BELL.

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